

TABLE 1

ACUTE TOXICITY OF CHLORIDE
TO AQUATIC ANIMALS

(From U.S. EPA Publication 440588001,
Ambient Water Quality Criteria for Chloride)

Table 1. Acute Toxicity of Chloride to Aquatic Animals

<u>Species</u>	<u>Method</u> ^a	<u>Chemical</u>	<u>Hardness</u> (mg/L as CaCO ₃)	<u>LC50</u> or <u>EC50</u> (mg/L) ^b	<u>Species Mean</u> <u>Acute Value</u> (mg/L) ^c	<u>Reference</u>
<u>FRESHWATER SPECIES</u>						
Snail, <u>Physa gyrina</u>	F, M	Sodium chloride	100	2,540	2,540	Birge et al. 1985
Snail, <u>Physa heterostropha</u>	S, U	Potassium chloride	-	451	-	Academy of Natural Sciences 1960; Patrick et al. 1968
Fingernail clam (adult >5 cm), <u>Musculium transversum</u>	S, M	Potassium chloride	263	168	-	Anderson 1977
Fingernail clam (adult >5 cm), <u>Musculium transversum</u>	S, H	Potassium chloride	243	254	-	Anderson 1977
Fingernail clam (juvenile <5 cm), <u>Musculium transversum</u>	S, M	Potassium chloride	263	472	-	Anderson 1977
Fingernail clam (juvenile <5 cm), <u>Musculium transversum</u>	S, M	Potassium chloride	243	907	-	Anderson 1977
Fingernail clam (juvenile <5 cm), <u>Musculium transversum</u>	S, M	Potassium chloride	234	1,655 ^d	-	Anderson 1977
Cladocera (1st instar), <u>Daphnia magna</u>	S, U	Sodium chloride	-	2,562 ^e	-	Anderson 1946

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Table 1. (continued)

Species	Method	Chemical	Hardness (mg/L as CaCO ₃)	LC50 or EC50 (mg/L) ^b	Species Mean Acute Value (mg/L) ^c	Reference
Cladocera, <i>Daphnia magna</i>	S, U	Potassium chloride	-	171	-	Dowden 1961
Cladocera, <i>Daphnia magna</i>	S, U	Calcium chloride	-	486	-	Dowden 1961
Cladocera, <i>Daphnia magna</i>	S, U	Sodium chloride	-	2,024	-	Dowden 1961
Cladocera, <i>Daphnia magna</i>	S, U	Calcium chloride	-	1,923	-	Dowden and Bennett 1965
Cladocera, <i>Daphnia magna</i>	S, U	Magnesium chloride	-	2,774	-	Dowden and Bennett 1965
Cladocera, <i>Daphnia magna</i>	S, U	Sodium chloride	-	3,563	-	Dowden and Bennett 1965
Cladocera, <i>Daphnia magna</i>	S, U	Potassium chloride	45	86	-	Biesinger and Christensen 1972
Cladocera, <i>Daphnia magna</i>	S, U	Calcium chloride	45	92	-	Biesinger and Christensen 1972
Cladocera, <i>Daphnia magna</i>	S, U	Magnesium chloride	45	409	-	Biesinger and Christensen 1972
Cladocera, <i>Daphnia magna</i>	S, U	Sodium chloride	45	2,565	2,650	Biesinger and Christensen 1972

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Table 1. (continued)

Species	Method ^a	Chemical	Hardness (mg/L as CaCO ₃)	LC50 or EC50 (mg/L) ^b	Species Mean Acute Value (mg/L) ^c	Reference
Cladocera, <u>Daphnia pulex</u>	R, M	Sodium chloride	93	1,470	1,470	Birge et al. 1985
Isopod, <u>Isoetes fontinalis</u>	F, M	Sodium chloride	100	2,950	2,950	Birge et al. 1985
Caddisfly, <u>Hydroptila angusta</u>	S, U	Sodium chloride	124	4,039 ^f	4,039	Hamilton et al. 1975
Mosquito (larva), <u>Culex</u> sp.	S, U	Sodium chloride	-	6,222 ^f	6,222	Dowden and Bennett 1965
Widge, <u>Chironomus attenuatus</u>	S, U	Sodium chloride	-	4,900	4,900	Thornton and Sauer 1972
Widge, <u>Cricotopus trifascia</u>	S, U	Potassium chloride	124	1,434	-	Hamilton et al. 1975
Widge, <u>Cricotopus trifascia</u>	S, U	Sodium chloride	124	3,795	3,795	Hamilton et al. 1975
American eel (55 mm), <u>Anguilla rostrata</u>	S, U	Sodium chloride	44	10,900	-	Hinton and Eversole 1978
American eel (97.2 mm), <u>Anguilla rostrata</u>	S, U	Sodium chloride	44	13,085	11,940	Hinton and Eversole 1979
Rainbow trout, <u>Salmo gairdneri</u>	R, U	Sodium chloride	-	3,336 ^g	-	Kostecki and Jones 1983
Rainbow trout, <u>Salmo gairdneri</u>	F, M	Sodium chloride	46	6,743	6,743	Spehar 1987

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Table 1. (continued)

<u>Species</u>	<u>Method^a</u>	<u>Chemical</u>	<u>Hardness (mg/L as CaCO₃)</u>	<u>LC50 or EC50 (mg/L)^b</u>	<u>Species Mean Acute Value (mg/L)^c</u>	<u>Reference</u>
Goldfish, <u>Carassius auratus</u>	S, U	Sodium chloride	-	8,388 ^d	-	Dowden and Bennett 1965
Goldfish, <u>Carassius auratus</u>	S, U	Sodium chloride	149	9,455 ^h	8,906	Thresher and Houston 1983
Fathead minnow, <u>Pimephales promelas</u>	F, M	Sodium chloride	100	6,570	6,570	Birge et al. 1985
Bluegill, <u>Lepomis macrochirus</u>	S, U	Potassium chloride	39	956	-	Tromb 1954
Bluegill, <u>Lepomis macrochirus</u>	S, U	Calcium chloride	39	6,804	-	Tromb 1954
Bluegill, <u>Lepomis macrochirus</u>	S, U	Sodium chloride	39	7,846	-	Tromb 1954
Bluegill (3.9 cm), <u>Lepomis macrochirus</u>	S, U	Calcium chloride	-	6,080	-	Cairns and Scheier 1959
Bluegill (6.1 cm), <u>Lepomis macrochirus</u>	S, U	Calcium chloride	-	6,080	-	Cairns and Scheier 1959
Bluegill (14.2 cm), <u>Lepomis macrochirus</u>	S, U	Calcium chloride	-	7,232	-	Cairns and Scheier 1959
Bluegill, <u>Lepomis macrochirus</u>	S, U	Potassium chloride	-	965	-	Academy of Natural Sciences 1960; Patrick et al. 1968

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Table 1. (continued)

Species	Method ^a	Chemical	Hardness (mg/L as CaCO ₃)	LCSO or EC50 (mg/L) ^b	Species Mean Acute Value (mg/L) ^c	Reference
Bluegill, <u>Lepomis macrochirus</u>	S, U	Calcium chloride	-	6,816	-	Academy of Natural Sciences 1960; Patrick et al. 1968
Bluegill, <u>Lepomis macrochirus</u>	S, U	Sodium chloride	-	7,897	-	Academy of Natural Sciences 1960; Patrick et al. 1968
Bluegill, <u>Lepomis macrochirus</u>	S, U	Potassium chloride	-	2,640 ^g	-	Dowden and Bennett 1965
Bluegill, <u>Lepomis macrochirus</u>	S, U	Calcium chloride	-	5,344 ^g	-	Dowden and Bennett 1965
Bluegill, <u>Lepomis macrochirus</u>	S, U	Sodium chloride	-	8,616 ^g	-	Dowden and Bennett 1965
Bluegill, <u>Lepomis macrochirus</u>	F, N	Sodium chloride	100	5,870	5,870	Birge et al. 1985

^a S = static; R = renewal; F = flow-through; U = unmeasured; N = measured.

^b Concentration of chloride, not the chemical.

^c Only data obtained with sodium chloride were used in calculation of Species Mean Acute Values. Data for other salts are presented for comparison purposes only.

^d Test temperature = 7°C; the other tests with this species were at 17°C.

^e Not used in calculations because qualitative values are available for this species.

^f This value is from a 48-hr test (see text).

^g This value is from a 24-hr test (see text).

^h This value was derived from the published graph.